

BIOCHIP READER WITH ENHANCED ILLUMINATION AND BIOARRAY POSITIONING APPARATUS

Abstract of the Disclosure

5 A method of illumination and illumination apparatus are provided in a
biochip reader. Illumination is provided by a non-collimated laser source or a
light emitting diode (LED). The light is directed to opposing sides of a glass
substrate by a pair of optical fiber bundles. The glass substrate carries a
bioarray. Each of the optical fiber bundles are splayed out to make a fan,
10 the fan being one fiber thick and defining a line of optical fiber faces. This
process randomizes any non-uniformity in the illumination source, creating a
more uniform illumination source. A respective divergent diffuser engages
each row of optical fiber faces coupling and diffusing light substantially
evenly through the opposing sides of the glass substrate to illuminate the
15 bioarray supported by the glass substrate. The glass substrate functions as
a secondary light guide. The divergent diffusers separate the optical fiber
faces from the edges of the glass substrate, protecting the optical fibers from
mechanical damage. A glass holder supports the glass substrate carrying
the bioarray. The glass holder including a plastics springs member in spring
20 contact engagement with the glass substrate for positioning said bioarray in
a focal plane. Light also can be directed to opposing ends of the glass
substrate by a second pair of optical fiber bundles. Also a single optical fiber
bundle can be used to direct light in one side of the glass substrate or three
optical fiber bundles can be used to direct light into the glass substrate. This
25 method of illumination provides a superior signal to noise ratio as compared
with conventional illumination systems.